Hindawi
Journal of Function Spaces
Volume 2023, Article ID 9810274, 1 page
https://doi.org/10.1155/2023/9810274

Retraction

Retracted: On Computation of Degree-Based Entropy of Planar Octahedron Networks

Journal of Function Spaces

Received 19 December 2023; Accepted 19 December 2023; Published 20 December 2023

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Manipulated or compromised peer review

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] T.-L. Sun, H. Ali, B. Ali, U. Ali, J.-B. Liu, and P. Ali, "On Computation of Degree-Based Entropy of Planar Octahedron Networks," *Journal of Function Spaces*, vol. 2022, Article ID 1220208, 9 pages, 2022.

Hindawi
Journal of Function Spaces
Volume 2022, Article ID 1220208, 9 pages
https://doi.org/10.1155/2022/1220208

Research Article

On Computation of Degree-Based Entropy of Planar Octahedron Networks

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Received 17 December 2021; Accepted 19 February 2022; Published 9 March 2022

Academic Editor: Hanan A. Al-Olayan

Chemical graph theory is the combination of mathematical graph theory and chemistry. To analyze the biocompatibility of the compounds, topological indices are used in the research of QSAR/QSPR studies. The degree-based entropy is inspired by Shannon's entropy. The connectivity pattern such as planar octahedron network is used to predict physiochemical activity. In this article, we present some degree-based entropies of planar octahedron network.

1. Introduction

All the graphs in this article are finite and undirected. A graph is set of points, where each pair of points (also known as vertex) are connected by an edge (also known as link or line). In network, vertices are called nodes, and in chemical graph, vertices are called atoms. In network, edges are called links or lines, while in chemical graph, they are called covalent bonds. The subbranch of chemical graph theory is topological indices. Many articles have been written on the topic of topological index. The representation of molecular graph by a drawing, a polynomial, a sequence of numbers, a matrix, or a derived number is called a topological index. As such, under graph isomorphism, these numeric numbers are unique. Most of the time, molecules and molecular compounds are nicely presented by molecular graph for better understanding.

Topological descriptors assume fundamental job in QSAR/QSPR studies in light of the fact that they convert a compound graph into a numerical number. We compare other physicochemical properties of carbon-based compounds (such as nanotubes, hydrocarbons, nanocones, and fullerenes). Due to these properties, topological descriptors have many applications in organic chemistry, biotechnology, and nanotechnology.

Cheminformatics is a branch of science that participates in mathematics, chemistry, and IT. In chemical graph theory, we consider molecular graph's solution using the graph theory techniques which is the subdivision of mathematical chemistry. Molecules or atoms are represented by vertices in chemical graph theory, also the bonds between them by edges [1].

The pioneer of topological indices is Wiener [2]. It is defined as

$$W(\mathscr{G}) = \sum_{(\breve{u},\check{v})\subseteq\mathscr{V}(\mathscr{G})} d(\breve{u},\check{v}). \tag{1}$$

Randić presented first the vertex-degree-based topological index in 1975 [3], which is written by

$$R_{-1/2}(\mathscr{G}) = \sum_{e=\breve{u}\check{v}\in\mathscr{E}(\mathscr{G})} \frac{1}{\sqrt{d_{\breve{u}} d_{\check{v}}}}. \tag{2}$$

Bollobás and Erdos [4] and Amić et al. [5] compute the "general Randić index" independently in 1998.

$$R_\alpha(\mathscr{G}) = \sum_{e=\breve{u}\breve{v}\in\mathscr{E}(\mathscr{G})} (d_{\breve{u}} d_{\breve{v}})^{\alpha}, \tag{3}$$

where $\alpha = -1/2, 1/2, 1, -1$.

ABC index was introduced in 1998, by Estrada et al. [6]. It has the formulae

$$ABC(\mathscr{G}) = \sum_{e=\breve{u}\breve{v}\in\mathscr{E}(\mathscr{G})} \sqrt{\frac{d_{\breve{u}} + d_{\breve{v}} - 2}{d_{\breve{u}} d_{\breve{v}}}}. \tag{4}$$

Vukičević and Furtula were the persons who studied this index for the first time [7]. It is written as *GA* index and written as

$$GA(\mathscr{G}) = \sum_{e=\breve{u}\breve{v}\in\mathscr{E}(\mathscr{G})} \frac{2\sqrt{d_{\breve{u}} d_{\breve{v}}}}{(d_{\breve{u}} + d_{\breve{v}})}. \tag{5}$$

Entropy is the uncertainty in a random variable or quantity. In other words, it is the information obtained by learning the values of some unknown variables. Entropy has many applications in information theory as information entropy, in chemistry as thermodynamic entropy, and in graph theory as graph entropy [8–16]. In general, entropy is defined as the following: Let x be a discrete random variable and $x \in X$ and p be the probability distribution of set X. Then, entropy of x is

$$H(x) = -\sum_{x\in X} p(x) \log p(x). \tag{6}$$

The definition of entropy was given by Shannon in 1948 [17]. In graph theory, the idea of graph entropy was given by Rashevsky in 1955 [18]. It has been used comprehensively to depict the design of graph-based systems in mathematical science [19]. The graph entropy is defined as the following:

For a graph $\mathscr{G}$, $\mathscr{V}(\mathscr{G})$ is finite vertex set. Let $\mathscr{P}$ be the density of probability of vertex set and $\mathscr{V}\mathscr{P}(\mathscr{G})$ be the vertex packing polytope of $\mathscr{G}$. Then, entropy of $\mathscr{G}$ with respect to $\mathscr{P}$ is

$$H(\mathscr{G}, \mathscr{P}) = \min_{a\in\mathscr{V}\mathscr{P}(\mathscr{G})} \sum_{i=1}^{n} p_i \log\left(\frac{1}{a_i}\right). \tag{7}$$

Octahedron networks have its roots in physical world as natural crystals of diamond are octahedron; also, many metal ions have octahedron configuration. In physics, these networks can be used as circuits. The construction of planar octahedron network *POH* is based on silicate structure derived by Manuel and Rajasingh [20] and *POH* was derived by Simonraj and George [21] (for the complete construction of *POH*, see Figure 1, for triangular prism network *TP*, see Figure 2, and for hex planar octahedron network, see Figure 3; we refer the reader to read the article [22]).

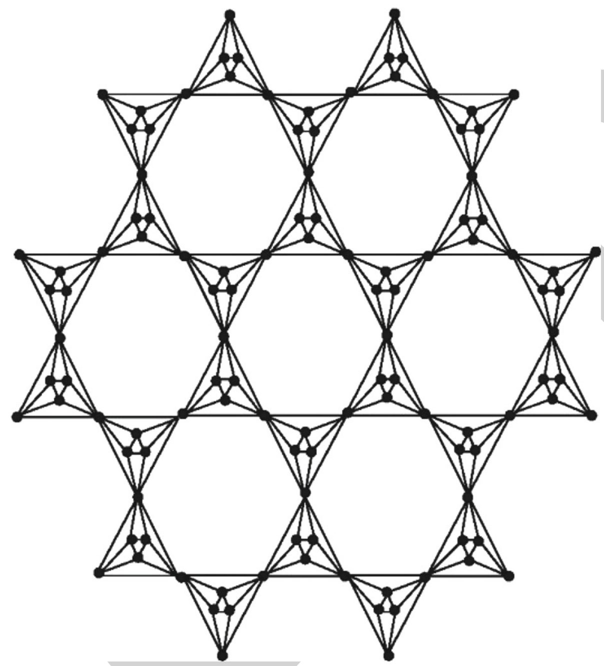

Figure 1: Planar octahedron network.

Degree-based entropy is defined as

$$ENT_{\psi}(\mathscr{G}) = -\sum_{i=1}^{p} \frac{d(\breve{v}_i)}{\sum_{j=1}^{p} d(\breve{v}_j)} \log\left[\frac{d(\breve{v}_i)}{\sum_{j=1}^{p} d(\breve{v}_j)}\right]. \tag{8}$$

From Equation (8), edge-based entropy can be deducted as

$$ENT_{d}(\mathscr{G}) = -\sum_{\breve{u}'\breve{v}'\in\mathscr{E}(G)} \frac{d\left(\breve{u}'\breve{v}'\right)}{\sum_{\breve{u}\breve{v}\in\mathscr{E}(\mathscr{G})} d(\breve{u}\breve{v})} \log\left[\frac{d\left(\breve{u}'\breve{v}'\right)}{\sum_{\breve{u}\breve{v}\in\mathscr{E}(\mathscr{G})} d(\breve{u}\breve{v})}\right]. \tag{9}$$

From Equation (3) and Equation (9), Randić entropy will be

$$ENT_{R_\alpha}(\mathscr{G}) = \log(R_\alpha) - \frac{1}{R_\alpha} \sum_{i=1}^{m} \sum_{\breve{u}\breve{v}\in\mathscr{E}_i(\mathscr{G})} [((d(\breve{u}) \times d(\breve{v}))^{\alpha}]^{((d(\breve{u})\times d(\breve{v}))^{\alpha}}. \tag{10}$$

From Equation (4) and Equation (9), *ABC* entropy will be

$$ENT_{ABC}(\mathscr{G}) = \log(ABC) - \frac{1}{ABC} \sum_{i=1}^{m} \sum_{\breve{u}\breve{v}\in\mathscr{E}_i(\mathscr{G})} \log \cdot \left[\sqrt{\frac{d(\breve{u}) + d(\breve{v}) - 2}{d(\breve{u}) \times d(\breve{v})}}\right]^{\sqrt{d(\breve{u})+d(\breve{v})-2/d(\breve{u})\times d(\breve{v})}}. \tag{11}$$

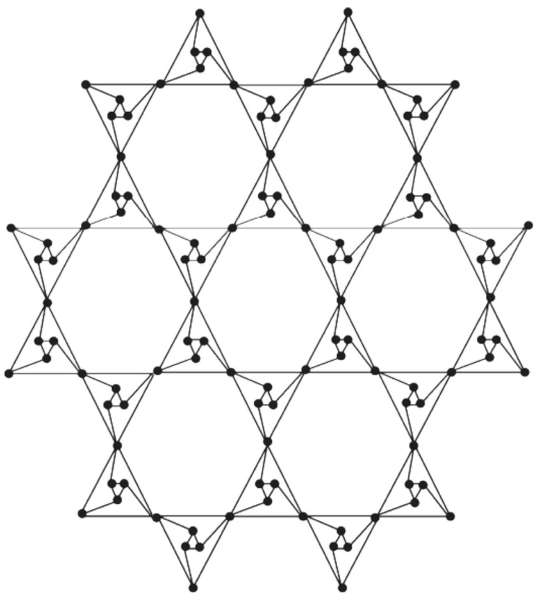

Figure 2: Triangular prism network.

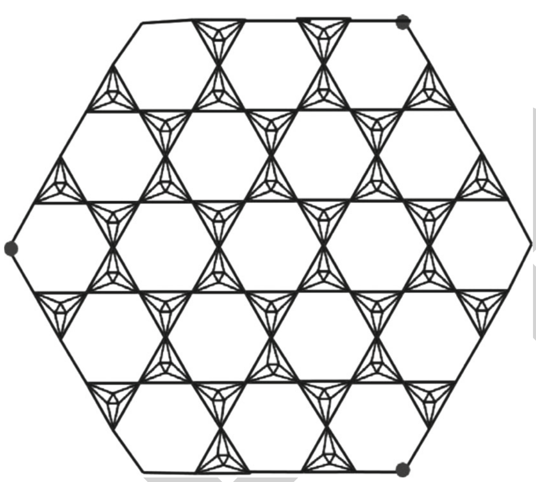

Figure 3: Hex planar octahedron network.

From Equation (5) and Equation (9), GA entropy will be

$$ENT_{GA}(\mathscr{G}) = \log(GA) - \frac{1}{GA}\sum_{i=1}^{m}\sum_{\breve{u}\breve{v}\in\mathscr{E}_i(\mathscr{G})}\log \cdot \left[\frac{2\sqrt{d(\breve{u})\times d(\breve{v})}}{d(\breve{u})+d(\breve{v})}\right]^{2\sqrt{d(\breve{u})\times d(\breve{v})}/d(\breve{u})+d(\breve{v})}. \quad (12)$$

2. Main Results

Planar octahedron network and its derived forms are inorganic structures used in chemistry. Here, we research some degree-based entropies for these networks. These days, there is a broad examination movement on entropies (for further studies, see [23, 24]; for basic definitions and notations, we refer the reader to [25, 26]).

2.1. Results on Planar Octahedron Network. In this section, we will compute Randić, ABC, and GA entropies for planar octahedron network. The edge partition of $POH(n)$ is written in Table 1.

2.1.1. Randić Entropy. If $\mathscr{G}_1 \cong POH(n)$, then from Table 1 and Equation (3), we have

$$R_\alpha(\mathscr{G}_1) = \left(18n^2+12n\right)\times(16)^\alpha + \left(36n^2\right)\times(32)^\alpha + \left(18n^2-12n\right)\times(64)^\alpha. \quad (13)$$

For $\alpha = 1$,

$$R_1(\mathscr{G}_1) = 2592n^2 - 576n. \quad (14)$$

For $\alpha = -1$,

$$R_{-1}(\mathscr{G}_1) = \frac{81}{32}n^2 + \frac{9}{16}n. \quad (15)$$

For $\alpha = 1/2$,

$$R_{1/2}(\mathscr{G}_1) = 419.65n^2 - 48n. \quad (16)$$

For $\alpha = -1/2$,

$$R_{-1/2}(\mathscr{G}_1) = 13.11n^2 + 1.5n. \quad (17)$$

Using Equation (10) and Table 1, we have

$$ENT_{R_\alpha}(\mathscr{G}_1) = \log(R_\alpha) - \frac{1}{R_\alpha}\left[\left(18n^2+12n\right)\times\left(16^\alpha\right)^{\left(16^\alpha\right)} + \left(36n^2\right)\times\left(32^\alpha\right)^{\left(32^\alpha\right)} + \left(18n^2-12n\right)\times\left(64^\alpha\right)^{\left(64^\alpha\right)}\right]. \quad (18)$$

For $\alpha = 1$,

$$ENT_{R_1}(\mathscr{G}_1) = \log(R_1) - \frac{1}{R_1}\left[\left(18n^2+12n\right)\times(16)^{(16)} + \left(36n^2\right)\times(32)^{(32)} + \left(18n^2-12n\right)\times(64)^{(64)}\right],$$

$$ENT_{R_1}(\mathscr{G}_1) = \log(R_1) - \frac{1}{R_1}\left[7.09\times10^{116}n^2 - 4.73\times10^{116}n\right]. \quad (19)$$

For $\alpha = -1$,

$$ENT_{R_{-1}}(\mathscr{G}_1) = \log(R_{-1}) - \frac{1}{R_{-1}}\left[\left(18n^2+12n\right)\times\left(\frac{1}{16}\right)^{1/16} + \left(36n^2\right)\times\left(\frac{1}{32}\right)^{1/32} + \left(18n^2-12n\right)\times\left(\frac{1}{64}\right)^{1/64}\right],$$

$$ENT_{R_{-1}}(\mathscr{G}_1) = \log(R_{-1}) - \frac{1}{R_{-1}}\left[64.31n^2 - 1.15n\right]. \quad (20)$$

Table 1: Edge partition.

$(d(\check{u}), d(\check{v}))$	Number of edges
$(4, 4)$	$18n^2 + 12n$
$(4, 8)$	$36n^2$
$(8, 8)$	$18n^2 - 12n$

For $\alpha = 1/2$,

$$ENT_{R_{1/2}}(\mathcal{G}_1) = \log\,(R_{1/2}) - \frac{1}{R_{1/2}}\left[\left(18n^2 + 12n\right) \times \left(\sqrt{16}\right)^{(\sqrt{16})} + \left(36n^2\right) \times \left(\sqrt{32}\right)^{(\sqrt{32})} + \left(18n^2 - 12n\right) \times \left(\sqrt{64}\right)^{(\sqrt{64})}\right],$$

$$ENT_{R_{1/2}}(\mathcal{G}_1) = \log\,(R_{1/2}) - \frac{1}{R_{1/2}}\left[3.03 \times 10^8 n^2 - 2.01 \times 10^8 n\right]. \tag{21}$$

For $\alpha = -1/2$,

$$ENT_{R_{-1/2}}(\mathcal{G}_1) = \log\,(R_{-1/2}) - \frac{1}{R_{-1/2}}\left[\left(18n^2 + 12n\right) \times \left(\frac{1}{\sqrt{16}}\right)^{1/\sqrt{16}} + \left(36n^2\right) \times \left(\frac{1}{\sqrt{32}}\right)^{1/\sqrt{32}} + \left(18n^2 - 12n\right) \times \left(\frac{1}{\sqrt{64}}\right)^{1/\sqrt{64}}\right],$$

$$ENT_{R_{-1/2}}(\mathcal{G}_1) = \log\,(R_{-1/2}) - \frac{1}{R_{-1/2}}\left[53.108973n^2 - 0.767984n\right], \tag{22}$$

where R_α for $\alpha = 1, -1, 1/2, -1/2$ is written in (14), (15), (16), and (17), respectively.

2.1.2. ABC Entropy. If $\mathcal{G}_1 \cong POH(n)$, then from Table 1 and Equation (4), we have

$$ABC(\mathcal{G}_1) = \left(18n^2 + 12n\right) \times \sqrt{\frac{4+4-2}{4\times 4}} + \left(36n^2\right) \times \sqrt{\frac{4+8-2}{4\times 8}} + \left(18n^2 - 12n\right) \times \sqrt{\frac{8+8-2}{8\times 8}},$$

$$ABC(\mathcal{G}_1) = 39.576045n^2 + 1.735983n. \tag{23}$$

Using Equation (11) and Table 1, we have

$$ENT_{ABC}(\mathcal{G}_1) = \log\,(ABC) - \frac{1}{ABC}\left[\left(18n^2 + 12n\right) \times \left(\sqrt{\frac{4+4-2}{4\times 4}}\right)^{\sqrt{4+4-2/4\times4}} + \left(36n^2\right) \times \left(\sqrt{\frac{4+8-2}{4\times 8}}\right)^{\sqrt{4+8-2/4\times8}} + \left(18n^2 - 12n\right) \times \left(\sqrt{\frac{8+8-2}{8\times 8}}\right)^{\sqrt{8+8-2/8\times8}}\right],$$

$$ENT_{ABC}(\mathcal{G}_1) = \log\,(ABC) - \frac{1}{ABC}\left[51.954483n^2 + 0.47643n\right], \tag{24}$$

where ABC index is written in (24).

2.1.3. GA Entropy. If $\mathcal{G}_1 \cong POH(n)$, then from Table 1 and Equation (5), we have

$$ENT_{GA}(\mathcal{G}_1) = \left(18n^2 + 12n\right) \times \left(\frac{2\sqrt{4\times 4}}{4+4}\right) + \left(36n^2\right) \times \left(\frac{2\sqrt{4\times 8}}{4+8}\right) + \left(18n^2 - 12n\right) \times \left(\frac{2\sqrt{8\times 8}}{8+8}\right),$$

$$ENT_{GA}(\mathcal{G}_1) = 69.941125n^2. \tag{25}$$

Using Equation (12) and Table 1, we have

$$ENT_{GA}(\mathcal{G}_1) = \log\,(GA) - \frac{1}{GA}\left[\left(18n^2 + 12n\right) \times \left(\frac{2\sqrt{4\times 4}}{4+4}\right)^{2\sqrt{4\times4}/4+4} + \left(36n^2\right) \times \left(\frac{2\sqrt{4\times 8}}{4+8}\right)^{2\sqrt{4\times8}/4+8} + \left(18n^2 - 12n\right) \times \left(\frac{2\sqrt{8\times 8}}{8+8}\right)^{2\sqrt{8\times8}/8+8}\right],$$

$$ENT_{GA}(\mathcal{G}_1) = \log\,(GA) - \frac{1}{GA}\left[70.055634n^2\right], \tag{26}$$

where GA index is written in (26).

2.2. Results on Triangular Prism Network. In this section, we will compute Randić, ABC, and GA entropies for triangular prism network. The edge partition of $TP(n)$ is written in Table 2.

2.2.1. Randić Entropy. If $\mathcal{G}_2 \cong TP(n)$, then from Table 2 and Equation (3), we have

$$R_\alpha(\mathcal{G}_2) = \left(18n^2 + 6n\right) \times (9)^\alpha + \left(18n^2 + 6n\right) \times (18)^\alpha + \left(18n^2 - 12n\right) \times (36)^\alpha. \tag{27}$$

For $\alpha = 1$,

$$R_1(\mathcal{G}_2) = 1134n^2 - 270n. \tag{28}$$

For $\alpha = -1$,

$$R_{-1}(\mathcal{G}_2) = \frac{7}{2}n^2 + \frac{2}{3}n. \tag{29}$$

For $\alpha = 1/2$,

$$R_{1/2}(\mathcal{G}_2) = 238.367532n^2 - 28.544156n. \tag{30}$$

Table 2: Edge partition.

$(d(\check{u}), d(\check{v}))$	Number of edges
$(3, 3)$	$18n^2 + 6n$
$(3, 6)$	$18n^2 + 6n$
$(6, 6)$	$18n^2 - 12n$

For $\alpha = -1/2$,

$$R_{-1/2}(\mathscr{G}_2) = 13.242641n^2 + 1.414214n. \quad (31)$$

Using Equation (10) and Table 2, we have

$$ENT_{R_\alpha}(\mathscr{G}_2) = \log(R_\alpha) - \frac{1}{R_\alpha}\left[\left(18n^2+6n\right)\times\left(9^\alpha\right)^{9^\alpha} + \left(18n^2+6n\right)\times\left(18^\alpha\right)^{18^\alpha} + \left(18n^2-12n\right)\times\left(36^\alpha\right)^{36^\alpha}\right]. \quad (32)$$

For $\alpha = 1$,

$$ENT_{R_1}(\mathscr{G}_2) = \log(R_1) - \frac{1}{R_1}\left[\left(18n^2+6n\right)\times(9)^9 + \left(18n^2+6n\right)\times(18)^{18} + \left(18n^2-12n\right)\times(36)^{36}\right],$$

$$ENT_{R_1}(\mathscr{G}_2) = \log(R_1) - \frac{1}{R_1}\left[1.91\times10^{57}n^2 - 1.25\times10^{57}n\right]. \quad (33)$$

For $\alpha = -1$,

$$ENT_{R_{-1}}(\mathscr{G}_2) = \log(R_{-1}) - \frac{1}{R_{-1}}\left[\left(18n^2+6n\right)\times\left(\frac{1}{9}\right)^{1/9} + \left(18n^2+6n\right)\times\left(\frac{1}{18}\right)^{1/18} + \left(18n^2-12n\right)\times\left(\frac{1}{36}\right)^{1/36}\right],$$

$$ENT_{R_{-1}}(\mathscr{G}_2) = \log(R_{-1}) - \frac{1}{R_{-1}}\left[45.725143n^2 - 1.052817n\right]. \quad (34)$$

For $\alpha = 1/2$,

$$ENT_{R_{1/2}}(\mathscr{G}_2) = \log(R_{1/2}) - \frac{1}{R_{1/2}}\left[\left(18n^2+6n\right)\times\left(\sqrt{9}\right)^{\sqrt{9}} + \left(18n^2+6n\right)\times\left(\sqrt{18}\right)^{\sqrt{18}} + \left(18n^2-12n\right)\times\left(\sqrt{36}\right)^{\sqrt{36}}\right],$$

$$ENT_{R_{1/2}}(\mathscr{G}_2) = \log(R_{1/2}) - \frac{1}{R_{1/2}}\left[8.48\times10^5n^2 - 5.57\times10^5n\right]. \quad (35)$$

For $\alpha = -1/2$,

$$ENT_{R_{-1/2}}(\mathscr{G}_2) = \log(R_{-1/2}) - \frac{1}{R_{-1/2}}\left[\left(18n^2+6n\right)\times\left(\frac{1}{\sqrt{9}}\right)^{1/\sqrt{9}} + \left(18n^2+6n\right)\times\left(\frac{1}{\sqrt{18}}\right)^{1/\sqrt{18}} + \left(18n^2-12n\right)\times\left(\frac{1}{\sqrt{36}}\right)^{1/\sqrt{36}}\right],$$

$$ENT_{R_{-1/2}}(\mathscr{G}_2) = \log(R_{-1/2}) - \frac{1}{R_{-1/2}}\left[38.637309n^2 - 0.473952n\right]. \quad (36)$$

where R_α for $\alpha = 1, -1, 1/2, -1/2$ is written in (28), (29), (30) and (31).

2.2.2. ABC Entropy. If $\mathscr{G}_2 \cong TP(n)$, then from Table 2 and Equation (4), we have

$$ABC(\mathscr{G}_2) = \left(18n^2+6n\right)\times\sqrt{\frac{3+3-2}{3\times3}} + \left(18n^2+6n\right)\times\sqrt{\frac{3+6-2}{3\times6}} + \left(18n^2-12n\right)\times\sqrt{\frac{6+6-2}{6\times6}},$$

$$ABC(\mathscr{G}_2) = 32.711805n^2 + 1.417102n. \quad (37)$$

Using Equation (11) and Table 2, we have

$$ENT_{ABC}(\mathscr{G}_2) = \log(ABC) - \frac{1}{ABC}\left[\left(18n^2+6n\right)\times\left(\sqrt{\frac{3+3-2}{3\times3}}\right)^{\sqrt{3+3-2/3\times3}} + \left(18n^2+6n\right)\times\left(\sqrt{\frac{3+6-2}{3\times6}}\right)^{\sqrt{3+6-2/3\times6}} + \left(18n^2-12n\right)\times\left(\sqrt{\frac{6+6-2}{6\times6}}\right)^{\sqrt{6+6-2/6\times6}}\right],$$

$$ENT_{ABC}(\mathscr{G}_2) = \log(ABC) - \frac{1}{ABC}\left[39.988228n^2 + 0.486189n\right], \quad (38)$$

where ABC index is written in (37).

2.2.3. GA Entropy. If $\mathscr{G}_2 \cong TP(n)$, then from Table 2 and Equation (5), we have

$$ENT_{GA}(\mathscr{G}_2) = \left(18n^2+6n\right)\times\left(\frac{2\sqrt{3\times3}}{3+3}\right) + \left(18n^2+6n\right)\times\left(\frac{2\sqrt{3\times6}}{3+6}\right) + \left(18n^2-12n\right)\times\left(\frac{2\sqrt{6\times6}}{6+6}\right),$$

Table 3: Edge partition.

$(d(\check{u}), d(\check{v}))$	Number of edges
(4, 4)	$18n^2 + 18n - 30$
(4, 8)	$36n^2 - 48n + 12$
(8, 8)	$18n^2 - 36n + 18$

$$ENT_{GA}(\mathscr{G}_2) = 52.970563n^2 - 0.343146n. \quad (39)$$

Using Equation (12) and Table 2, we have

$$ENT_{GA}(\mathscr{G}_2) = \log(GA) - \frac{1}{GA}\left[(18n^2 + 6n) \times \left(\frac{2\sqrt{3\times 3}}{3+3}\right)^{2\sqrt{3\times3}/3+3} + (18n^2 + 6n) \times \left(\frac{2\sqrt{3\times 6}}{3+6}\right)^{2\sqrt{3\times6}/3+6} + (18n^2 - 12n) \times \left(\frac{2\sqrt{6\times 6}}{6+6}\right)^{2\sqrt{6\times6}/6+6}\right],$$

$$ENT_{GA}(\mathscr{G}_2) = \log(GA) - \frac{1}{GA}\left[53.027817n^2 - 0.324061n\right], \quad (40)$$

where GA index is written in (39).

2.3. Results on Hex Planar Octahedron Network. In this section, we will compute Randić, ABC, and GA entropies for hex planar octahedron network. The edge partition of hex $POH(n)$ is written in Table 3.

2.3.1. Randić Entropy. If $\mathscr{G}_3 \cong$ hex $POH(n)$, then from Table 3 and Equation (3), we have

$$R_\alpha(\mathscr{G}_3) = (18n^2 + 18n - 30) \times (16)^\alpha + (36n^2 - 48n + 12) \times (32)^\alpha + (18n^2 - 36n + 18) \times (64)^\alpha. \quad (41)$$

For $\alpha = 1$,

$$R_1(\mathscr{G}_3) = 2592n^2 - 3552n + 1056. \quad (42)$$

For $\alpha = -1$,

$$R_{-1}(\mathscr{G}_3) = \frac{81}{32}n^2 - \frac{15}{16}n - \frac{39}{32}. \quad (43)$$

For $\alpha = 1/2$,

$$R_{1/2}(\mathscr{G}_3) = 419.646753n^2 - 487.529004n + 91.882251. \quad (44)$$

For $\alpha = -1/2$,

$$R_{-1/2}(\mathscr{G}_3) = 13.113961n^2 - 8.485281n - 3.12868. \quad (45)$$

Using Equation (10) and Table 3, we have

$$ENT_{R_\alpha}(\mathscr{G}_3) = \log(R_\alpha) - \frac{1}{R_\alpha}\left[(18n^2 + 18n - 30) \times (16^\alpha)^{(16^\alpha)} + (36n^2 - 48n + 12) \times (32^\alpha)^{(32^\alpha)} + (18n^2 - 36n + 18) \times (64^\alpha)^{(64^\alpha)}\right]. \quad (46)$$

For $\alpha = 1$,

$$ENT_{R_1}(\mathscr{G}_3) = \log(R_1) - \frac{1}{R_1}\left[(18n^2 + 18n - 30) \times (16)^{(16)} + (36n^2 - 48n + 12) \times (32)^{(32)} + (18n^2 - 36n + 18) \times (64)^{(64)}\right],$$

$$ENT_{R_1}(\mathscr{G}_3) = \log(R_1) - \frac{1}{R_1}\left[7.09 \times 10^{116}n^2 - 14.2 \times 10^{116}n + 7.09 \times 10^{116}\right]. \quad (47)$$

For $\alpha = -1$,

$$ENT_{R_{-1}}(\mathscr{G}_3) = \log(R_{-1}) - \frac{1}{R_{-1}}\left[(18n^2 + 18n - 30) \times \left(\frac{1}{16}\right)^{1/16} + (36n^2 - 48n + 12) \times \left(\frac{1}{32}\right)^{1/32} + (18n^2 - 36n + 18) \times \left(\frac{1}{64}\right)^{1/64}\right],$$

$$ENT_{R_{-1}}(\mathscr{G}_3) = \log(R_{-1}) - \frac{1}{R_{-1}}\left[64.308408n^2 - 61.6719n + 2.408871\right]. \quad (48)$$

For $\alpha = 1/2$,

$$ENT_{R_{1/2}}(\mathscr{G}_3) = \log(R_{1/2}) - \frac{1}{R_{1/2}}\left[(18n^2 + 18n - 30) \times \left(\sqrt{16}\right)^{(\sqrt{16})} + (36n^2 - 48n + 12) \times \left(\sqrt{32}\right)^{(\sqrt{32})} + (18n^2 - 36n + 18) \times \left(\sqrt{64}\right)^{(\sqrt{64})}\right],$$

$$ENT_{R_{1/2}}(\mathscr{G}_3) = \log(R_{1/2}) - \frac{1}{R_{1/2}}\left[3.03 \times 10^8 n^2 - 6.05 \times 10^8 n + 3.02 \times 10^8\right]. \quad (49)$$

Table 4: Comparison table of entropies for $POH(n)$.

n	ENT_{R_1}	$ENT_{R_{-1}}$	$ENT_{R_{1/2}}$	$ENT_{R_{-1/2}}$	ENT_{ABC}	ENT_{GA}
6	-2.525×10^{113}	−22.4506	-6.546×10^5	−1.2835	1.8516	2.3994
7	-2.556×10^{113}	−22.4546	-6.645×10^5	−1.1628	1.9840	2.5333
8	-2.578×10^{113}	−22.4431	-6.717×10^5	−1.0567	2.0988	2.6493
9	-2.596×10^{113}	−22.4225	-6.774×10^5	−0.9622	2.2003	2.7516
10	-2.611×10^{113}	−22.3968	-6.819×10^5	−0.8768	2.2911	2.8431
11	-2.622×10^{113}	−22.3680	-6.856×10^5	−0.7992	2.3733	2.9258
12	-2.632×10^{113}	−22.3376	-6.886×10^5	−0.7278	2.4484	3.0015
13	-2.640×10^{113}	−22.3065	-6.913×10^5	−0.6619	2.5175	3.0709
14	-2.647×10^{113}	−22.2751	-6.935×10^5	−0.6006	2.5815	3.1354
15	-2.653×10^{113}	−22.2437	-6.954×10^5	−0.5434	2.6411	3.1953

Table 5: Comparison table of entropies for $TP(n)$.

n	ENT_{R_1}	$ENT_{R_{-1}}$	$ENT_{R_{1/2}}$	$ENT_{R_{-1/2}}$	ENT_{ABC}	ENT_{GA}
6	-1.563×10^{54}	−10.4998	−3228.67	−0.1748	1.8579	2.2787
7	-1.581×10^{54}	−10.4305	−3275.76	−0.0500	1.9905	2.4127
8	-1.594×10^{54}	−10.3633	−3310.88	0.0591	2.1055	2.5287
9	-1.604×10^{54}	−10.2992	−3338.08	0.1561	2.2070	2.6311
10	-1.612×10^{54}	−10.2384	−3359.77	0.2433	2.2979	2.7226
11	-1.619×10^{54}	−10.1807	−3377.46	0.3226	2.3802	2.8055
12	-1.625×10^{54}	−10.1263	−3392.17	0.3952	2.4554	2.8811
13	-1.629×10^{54}	−10.0746	−3404.58	0.4623	2.5245	2.9506
14	-1.633×10^{54}	−10.0256	−3415.21	0.5245	2.5886	3.0149
15	-1.637×10^{54}	−9.9789	−3424.39	0.5826	2.6482	3.0749

For $\alpha=-1/2$,

$$ENT_{R_{-1/2}}(\mathcal{G}_3)=\log\left(R_{-1/2}\right)-\frac{1}{R_{-1/2}}\left[\left(18n^2+18n-30\right)\times\left(\frac{1}{\sqrt{16}}\right)^{1/\sqrt{16}}+\left(36n^2-48n+12\right)\times\left(\frac{1}{\sqrt{32}}\right)^{1/\sqrt{32}}+\left(18n^2-36n+18\right)\times\left(\frac{1}{\sqrt{64}}\right)^{1/\sqrt{64}}\right],$$

$$ENT_{R_{-1/2}}(\mathcal{G}_3)=\log\left(R_{-1/2}\right)-\frac{1}{R_{-1/2}}\left[53.108973n^2-50.366744n+1.500412\right], \quad (50)$$

where R_α for $\alpha=1,-1,1/2,-1/2$ is written in (42), (43), (44), and (45), respectively.

2.3.2. ABC Entropy. If $\mathcal{G}_3\cong$ hex $POH(n)$, then from Table 3 and Equation (4), we have

$$ABC(\mathcal{G}_3)=\left(18n^2+18n-30\right)\times\sqrt{\frac{4+4-2}{4\times4}}+\left(36n^2-48n+12\right)\times\sqrt{\frac{4+8-2}{4\times8}}+\left(18n^2-36n+18\right)\times\sqrt{\frac{8+8-2}{8\times8}},$$

$$ABC(\mathcal{G}_3)=39.566045n^2-32.64757n-3.24424. \quad (51)$$

Using Equation (11) and Table 3, we have

$$ENT_{ABC}(\mathcal{G}_3)=\log(ABC)-\frac{1}{ABC}\left[\left(18n^2+18n-30\right)\times\left(\sqrt{\frac{4+4-2}{4\times4}}\right)^{\sqrt{4+4-2/4\times4}}+\left(36n^2-48n+12\right)\times\left(\sqrt{\frac{4+8-2}{4\times8}}\right)^{\sqrt{4+8-2/4\times8}}+\left(18n^2-36n+18\right)\times\left(\sqrt{\frac{8+8-2}{8\times8}}\right)^{\sqrt{8+8-2/8\times8}}\right],$$

Table 6: Comparison table of entropies for hex $POH(n)$.

n	ENT_{R_1}	$ENT_{R_{-1}}$	$ENT_{R_{1/2}}$	$ENT_{R_{-1/2}}$	ENT_{ABC}	ENT_{GA}
6	-2.425×10^{113}	−21.1812	−617561.93	−1.2328	1.7906	2.3284
7	-2.472×10^{113}	−21.3481	−632989.74	−1.1176	1.9324	2.4732
8	-2.507×10^{113}	−21.4624	−644447.57	−1.0161	2.0541	2.5972
9	-2.533×10^{113}	−21.5419	−653292.98	−0.9252	2.1608	2.7056
10	-2.555×10^{113}	−21.5978	−660327.95	−0.8430	2.2557	2.8019
11	-2.572×10^{113}	−21.6368	−666056.66	−0.7679	2.3413	2.8886
12	-2.586×10^{113}	−21.6636	−670812.03	−0.6988	2.4191	2.9675
13	-2.597×10^{113}	−21.6814	−674822.68	−0.6348	2.4906	3.0397
14	-2.608×10^{113}	−21.6922	−678250.84	−0.5752	2.5565	3.1064
15	-2.617×10^{113}	−21.6978	−681214.82	−0.5194	2.6178	3.1683

$$ENT_{ABC}(\mathcal{G}_3) = \log(ABC) - \frac{1}{ABC}\left[51.954483n^2 - 46.578698n - 0.932282\right], \quad (52)$$

where ABC index is written in (51).

2.3.3. GA Entropy. If $\mathcal{G}_3 \cong$ hex $POH(n)$, then from Table 3 and Equation (5), we have

$$ENT_{GA}(\mathcal{G}_3) = \left(18n^2 + 18n - 30\right) \times \left(\frac{2\sqrt{4\times4}}{4+4}\right) + \left(36n^2 - 48n + 12\right) \times \left(\frac{2\sqrt{4\times8}}{4+8}\right) + \left(18n^2 - 36n + 18\right) \times \left(\frac{2\sqrt{8\times8}}{8+8}\right),$$

$$ENT_{GA}(\mathcal{G}_3) = 69.941125n^2 - 63.254834n - 0.686292. \quad (53)$$

Using Equation (12) and Table 3, we have

$$ENT_{GA}(\mathcal{G}_3) = \log(GA) - \frac{1}{GA}\left[\left(18n^2 + 18n - 30\right) \times \left(\frac{2\sqrt{4\times4}}{4+4}\right)^{2\sqrt{4\times4}/4+4} + \left(36n^2 - 48n + 12\right) \times \left(\frac{2\sqrt{4\times8}}{4+8}\right)^{2\sqrt{4\times8}/4+8} + \left(18n^2 - 36n + 18\right) \times \left(\frac{2\sqrt{8\times8}}{8+8}\right)^{2\sqrt{8\times8}/8+8}\right],$$

$$ENT_{GA}(\mathcal{G}_3) = \log(GA) - \frac{1}{GA}\left[70.055634n^2 - 63.407512n - 0.648122\right], \quad (54)$$

where GA index is written in (53).

3. Discussion and Conclusion

In this article, we computed some degree-based topological indices of planar octahedron networks. After that, we used the definition of Shannon's graph entropy to find some exact results of entropies for planar octahedron networks. For the variational change in the values of entropies for the degree-based indices, we construct some tables to enlist the numerical values for these networks. It is clear from Tables 4, 5, and 6 that the increase in the value of n causes a proportional increase or decrease in the values of entropies for Randić, ABC and GA indices. These formulae and their numerical values will help the researchers to predict physio- and biochemical activities of these networks. These numerical values of entropies can also predict the amount of energy that is unavailable for the work done in a chemical system. Furthermore, our future work will based on entropies of some other complex networks.

Data Availability

No data were used to support this study.

Conflicts of Interest

The authors declare no conflict of interest.

Acknowledgments

This work was supported in part by the Natural Science Fund of Education Department of Anhui Province under Grant KJ2020A0478.

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